ENGINEERING REPORT

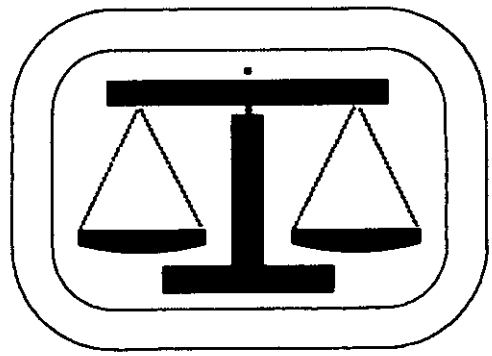
for

CONTRACT NUMBER DACW-33-81-D-0005
WORK ORDER NUMBER 0001

SUBSURFACE INVESTIGATION

B&M RAILROAD
PITTSFIELD, MA

June 15 & 16, 1982



BRIGGS

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1.0 GENERAL

1.1 Authorization

The work reported herein was performed under Contract DACW 33-81-D-0005, Work Order Number 0001, dated 11 February 1982. The authority for this project was derived from Public Law 205 of the 1948 Flood Control Act as amended, approval given by OCE, 17 July 1981.

1.2 Project Site

The site is located in Pittsfield, Massachusetts, approximately 1060 ft south of the intersection of the B & M Railroad and Route 20W (West Housatonic Street) along the railroad tracks. At this location, the railroad tracks are on top of an approximately 30-ft high embankment leading to the stone arch bridge over the Southwest Branch of the Housatonic River.

1.3 Purpose

The purpose of this work was to perform two SPT borings to determine the type of fill used in the railroad embankment and the foundation conditions for a proposed 3-96 inch reinforced concrete pipe culverts to be jacked through the railroad embankment.

1.4 Scope of the Investigation

Inspection and exploration instructions, which were provided by the Army Corps of Engineers, New England Division, are included in Appendix A.

The exploration program for the SPT borings consisted of drilling two test borings at the locations shown on the Boring Location Plan (Figure 1). The borings were located on the edge of the truncated railroad embankment adjacent to the railroad tracks. Drive sampling using a split-barrel sampler was performed at 5-foot intervals or changes in soil conditions. The field exploration logs are included in Appendix B.

2.0 SUBSURFACE CONDITIONS

2.1 Subsurface Materials

The following subsurface materials were encountered when the borings were drilled at the site.

a. Miscellaneous Fill, 1.75 ft in thickness at boring FD 82-1 and 5.0 ft at 1 FD 82-2 was encountered at the surface. The fill consists of Topsoil, Organic Silt, Clinkers and Coal fragments.

b. Embankment Fill, approximately 24 ft in thickness and consisting of Silty Sand and Silty Gravel underlies the miscellaneous surfical fill materials.

c. Flood Plain Deposits, approximately 35 ft in thickness, underlie the embankment fill. These flood plain deposits consist of thinly-layered, Sandy Silt, and Silty Sand with a change in gradation to Gravelly soils with an increase in depth.

d. Marble underlies the flood plain deposits in boring FD 82-1 at 60.4 ft below the top of the railroad embankment or elevation 931.5 ft, and extends to the maximum depth explored (65.4 ft). The rock is a fresh/unweathered, hard, fine grained marble.

e. Groundwater was encountered at 26.0 and 26.1 ft below the existing ground surface at borings FD 82-1 and FD 82-2, respectively.

3.0 QUALITY CONTROL

3.1 General

All work was conducted in accordance with the procedures outlined in ASTM D-1586-67, Penetration Test and Split-Barrel Sampling of Soils. The equipment utilized by Briggs Engineering & Testing Co. to perform the required drilling work is described below. All equipment was in satisfactory working condition at the start of the project work.

a. Core Drill: The core drill used was a modern, hydraulically-driven, rotary-head unit manufactured by Acker Drill Company. The drill rig was mounted on a bombardier.

b. Drive Hammer: The drive hammer used to advance the split-barrel sampler weighed approximately 140 pounds.

c. Casing and Rods: BW (2-3/8 in. I.D.) flush joint casing was used to keep the borehole open. AW-size drill rods were used in washing out the borehole and driving the split-barrel sampler.

d. Samplers: The equipment employed to obtain soil samples was a 1-3/8-inch I.D. by 24-inch split-barrel sampler with a ball check head and spring-type retainer. The equipment used to obtain rock samples was the swivel head, double tube, BX core barrel, 5 ft in length, with a surface mounted diamond bit.

3.2 Records

NED Forms 58 and 58A, dated March 1971 and entitled "Field Log of Test Boring" were used to record pertinent drilling and sampling data and Form 130, dated December 1963, entitled "Field Log of Test Boring in Rock" for rock coring data. The logs include the following:

a. Site location, boring location, and number.

b. Make and model of drilling equipment.

c. Type of drilling and sampling operation by depth.

d. Depths at which soil samples were recovered, including top and bottom depth of each run. Classification or description of the soil and rock samples obtained. Indication of penetration resistance such as drive hammer blows given in blows per 6 in. penetration depth for driving sample spoons.

e. Length of sample of soil recovered per sampling run.

f. Depth at which groundwater is encountered.

3.3 Procedures

a. Boreholes were advanced by sampling in which a 1-3/8-inch by 24-inch split-barrel sampler was advanced below the bottom of the casing or washed hole into undisturbed soil by the impact of a hammer weighing approximately 140 pounds falling 30 inches. Refusal was defined as 100 blows for penetration of less than 18 inches.

b. The sample spoon shoes were kept reasonably sharp at all times. Dull, bent, or otherwise damaged samplers were not used. Following sampling, the casing was advanced and cleaned out using appropriately sized roller bits.

c. Samples were classified in the field immediately following the taking of the sample. Classification was in accordance with ASTM D-2487 and D-2488. Representative samples were take from each soil sampling run and placed in 16 oz. glass jars with hermetically sealed lids. Jars were labeled with sample number, sampling interval, boring number,date, location, and soil description. A chain of custody log was maintained documenting custody of the samples between the field and transportation and delivery to the laboratory at NED.

d. Upon reaching the top of rock, the borehole was advanced by coring with a swivel-head, double tube, BX core barrel. Sampling runs did not exceed five feet.

3.4 Safety

The work was performed without personal injury or accident. The contractor's personnel wore hard hats for personal protection. The geotechnical inspector conducted weekly safety briefings. The Safety Reports are attached to this report.

3.5 Survey

Boring elevations were determined using a hand level. The bench mark used to determine the elevations was a chisel square on the second step from the top of the northeast end of the wall of the railroad trestle (Deloye), elevation 990.35 ft, Pittsfield datum.

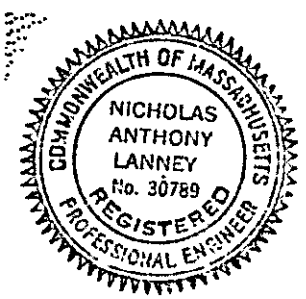
4.0 QUALITY CONTROL CERTIFICATION

I hereby certify that the above mentioned records, equipment, and procedures were used to perform the subsurface exploration described herein. I also certify that the work was performed in a professional manner and meets the requirements set forth in the work order.

CERTIFIED 25 June 1982

Nicholas A. Lanney

Nicholas A. Lanney, P.E.
Massachusetts No. 30789



BRIGGS ENGINEERING CORPORATION

Chain of Custody Log

Project: Subsurface Investigation: Proposed Pipeline
B & M Railroad
Pittsfield, MA

Items:

Tubes	None
Bottles	None
Jar Samples	24
Core Boxes	1
Sampling Logs	Borings FD 82-1, FD 82-2.

Date & Time Received	Date & Time Transfered	Comments	Custodian
as sampled	6-23-82 0830		Ronald F. Babel
6-23-82 0850	6-23-82 0830		Steven Mark
6/23/82 12:30			J P Razzo

BRIGGS ENGINEERING CORPORATION

WEEKLY SAFETY MEETING

TO: Safety Office, NED

FROM: Field Engineer Date held 6-15-82

THRU: Project Engineer Time 0700

Weekly safety meeting was held this date for the following personnel:
Contract No. DACW 33-81-D-0005 Personnel present: Richie Jones
Work Order No. 01 Wally Souza
Conducted By: R.F. Bukoski

1. Subjects discussed (Note, delete, or add):

x Individual Protective Equipment -
Prevention of Falls -
x Safe Lifting Techniques -
Emergency Communications -
Fire Prevention -
Sanitation, First Aid -
Tripping Hazards - trash, hose, nails in lumber -
Staging, Ladders, Concrete Forms -
Hand Tools -
Portable Power Tools -
Woodworking Machinery -
X Equipment Maintenance (Zero defects) -
x Hoisting Equipment -
X Ropes, Hooks, Chains and Slings -
Electrical Grounding, Temporary Wiring -
Lockouts for safe clearance procedures -
Electrical, pressure, moving parts -
Welding -
Excavations -
X Loose Rock and Steep Slopes -
Explosives -
Water Safety -
Other -

Prepared by: Ronald F. Bukoski
Field Engineer

2. Exposure:
No previous exposure, start of new work order.

Signature: Nicholas A. Lowney
Project Engineer

3. Forwarded: NED, Waltham, MA

BRIGGS ENGINEERING CORPORATION

WEEKLY SAFETY MEETING

TO: Safety Office, NED

FROM: Field Engineer Date held 6-17-82

THRU: Project Engineer Time ----

Weekly safety meeting was held this date for the following personnel:
Contract No. DACW 33-81-D-0005 Personnel present: Richie Jones
Work Order No. 01 Wally Souza
Conducted By: R.F. Bukoski

1. Subjects discussed (Note, delete, or add):

Individual Protective Equipment -
Prevention of Falls -
Safe Lifting Techniques -
Emergency Communications -
Fire Prevention -
Sanitation, First Aid -
Tripping Hazards - trash, hose, nails in lumber -
Staging, Ladders, Concrete Forms -
Hand Tools -
Portable Power Tools -
Woodworking Machinery -
Equipment Maintenance (Zero defects) -
Hoisting Equipment -
Ropes, Hooks, Chains and Slings -
Electrical Grounding, Temporary Wiring -
Lockouts for safe clearance procedures -
Electrical, pressure, moving parts -
Welding -
Excavations -
Water Safety -
X Other - Comments by Mr. Ed swift: June 15, 1982
1. Safety gas cans
2. Muffler for drill rig

Prepared by: Ronald F. Bukoski
Field Engineer

2. Exposure:
For the week of 14 June 1982, covering 3 men for a total of 66 man-hours
Field work for Work Order No. 01 completed on 16 June 1982.

Signature: Nicholas A. Lowney
Project Engineer

3. Forwarded: NED, Waltham, MA

BRIGGS ENGINEERING & TESTING CO.
164 WASHINGTON ST. NORWELL, MA.

TITLE: BORING LOCATIONS
PITTSFIELD, MA.

SCALE: 1" = 20'

DATE: 22 JUNE 52

DRAWN: J.B.S.

CHECKED: R.F.B.

SHEET of
1 OF 1

APPENDIX A: INSPECTION AND EXPLORATION INSTRUCTIONS

INSPECTION AND EXPLORATION INSTRUCTIONS

Work shall be accomplished at Pittsfield, Massachusetts, in accordance with the project contract and the following conditions:

Borings shall be sampled, classified and logged in accordance with procedures indicated in the contract technical provisions.

Boring "A" shall be sampled to a depth of 65 lineal feet from the top of ground or to top of bedrock. If bedrock is encountered, a maximum of 15 lineal feet shall be cored. If refusals are encountered, they shall be cored until breakthrough is encountered and sampling resumed until overburden depth is reached or 15 feet of bedrock is cored.

Boring "B" shall be sampled to a depth of 35 lineal feet from top of ground. If refusals are encountered, they shall be cored until breakthrough is encountered and sampling resumed to the required depth.

Water conditions shall be recorded indicationg any changes or loss during the progress of the boring.

Locations and boring ties shall be by distance from the existing features as shown on print. Top boring elevations shall be provided to the nearest two-tenths of a foot. Should boring locations require adjustment, they may be moved parallel to the railroad track a maximum distance of fifteen feet.

APPENDIX B: FIELD LOGS OF TEST BORINGS

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site PITTSFIELD, MA. Page 1 of 5 Pages

Boring No. ED 52-1 Desig. A Diam. (Casing) 4.0" & 2-3/8"

Co-ordinates. N NOT GIVEN E

Elevation Top of Boring 991.9' M.S.L.
Total Overburden Drilled 60.4 Feet
Elevation Top of Rock 931.5' M.S.L.
Total Rock Drilled 5.0' Feet
Elevation Bottom of Boring 926.5' M.S.L.
Total Depth of Boring 65.4' Feet
Core Recovered 64 % No. Boxes 1
Core Recovered 3.2 Ft. Diam. 1-7/8 In.
Soil Samples 1-3/8 In. Diam. 15 No.
Soil Samples ____ In. Diam. ____ No.

Hammer Wt. 140 lb. Boring Started 6-15-52
Hammer Drop 30 Boring Completed 6-16-52
Casing Left NONE
Subsurface Water Data ____ Page ____
Obs. Well NO
Drilled By RAYMOND FOUNDATION & TESTING CO.
Mfg. Des. Drill MOBILE-GARDNER
Inspected By: THOMAS F. RUNDELL
Classification By: RICHARD F. RUNDELL
Classification By: ____

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
0.0'	S-1 1 JAR	1-3/8"	0.0 TO 1.75'	2 3 3	DROVE 1-3/8" I.D. x 24" SPLIT BARREL SAMPLER FROM 0.0 TO 2.0'. RECOVERED 13½".	SURFACE: ADJACENT TO ABANDONED R.R. TRACKS, GRASS COVERED, EMBANKMENT. TOPSOIL: ORGANIC SANDY SILT, NONPLASTIC TO LOW PLASTICITY, 20-35% COARSE TO FINE SAND, 10-15% FINE GRAVEL AND COAL FRAGMENTS, DAMP, BLACK (OL).
1.0'						
2.0'	S-1A 1 JAR	1-3/8	1.75' 2.0'	4		S-1A: FILL: R.R. EMBANKMENT SILTY SAND, UNIFORM FINE SAND, 15-20% NONPLASTIC FINES, 10-15% FINE GRAVEL, SLIGHTLY DAMP, LIGHT BROWN, (SM).
3.0'	NO SAMPLE		2.0 TO 5.0'		DROVE 4.0" CASING FROM 0.0 TO 5.0' AND PULLED. HOLE REMAINED OPEN FOR SAMPLING AT 5.0'.	FILL: R.R. EMBANKMENT SILTY SAND WELL GRADED SAND, COARSE TO FINE, 15-20% NONPLASTIC FINES, 10-15% FINE SUBANGULAR GRAVEL, LIGHT BROWN, DAMP. (SM).
4.0'						
5.0'						
6.0'	S-2 1 JAR	1-3/8"	5.0 TO 7.0'	3 3 3 3	DROVE 1-3/8" I.D. x 24" SPLIT BARREL SAMPLER FROM 5.0 TO 7.0' RECOVERED 19-0".	
7.0'						
8.0'	NO SAMPLE		7.0 TO 10.0'		DROVE 4.0" FROM 5.0 TO 10.0' WASHED OUT USING CHOPPING BIT.	
9.0'						
10.0'						

GENERAL REMARKS: GROUNDWATER AT 26.0' BELOW GROUND SURFACE AT ½ HR. FOLLOWING COMPLETION OF DRILL. BORING LOCATION ESTIMATED ON TOP OF 25-30' HIGH R.R. EMBANKMENT.

Site: Pittsfield, MA B&M R.R.	Boring No. FD 82-1	Page 2 of 5

DEPTH	CORE/SAMPLE NO.	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT. CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
10.0'						
11.0'	S-3 1 JAR	1-3/8"	10.0 TO 12.0'	8 4 5 7	DROVE 1-3/8" I.D., 24" SPLIT BARREL SAMPLER FROM 10.0 TO 12.0'. RECOVERED 8-0".	SILTY SAND, WELL GRADED, COARSE TO FINE SAND, 15-25% NONPLASTIC FINES, 5-10% FINE GRAVEL, MOIST, BROWN, (SM). (FILL, R.R. EMBANKMENT)
12.0'						
13.0'	NO SAMPLE		12.0 TO 15.0'		DROVE 4.0" CASING FROM 10.0 TO 15.0'. WASHED OUT USING ROLLER ROCK BIT. RETAINED WATER DURING WASHING.	
14.0'						
15.0'						FILL: R.R. EMBANKMENT
16.0'	S-4 1 JAR	1-3/8"	15.0 TO 17.0'	5 7 9 9	DROVE 1-3/8" I.D SPLIT BARREL SAMPLER FROM 15.0 TO 17.0'. RECOVERED 6-0".	SILTY SAND, WELL GRADED, COARSE TO FINE SAND, 15-25% NONPLASTIC FINES, 5-10% FINE GRAVEL, MOIST TO SATURATED PROBABLY FROM WASH, BROWN, (SM).
17.0'						
18.0'	NO SAMPLE		17.0 TO 20.0'		DROVE 4.0" CASING FROM 15.0 TO 20.0' AND WASHED OUT USING ROLLER ROCK BIT. RETAINED WASH WATER.	
20.0'						
21.0'	S-5 1 JAR	1-3/8"	20.0 TO 22.0'	5 7 7 9	DROVE 1-3/8" I.D. X 24" SPLIT BARREL SAMPLER FROM 20.0 TO 22.0'. RECOVERED 13-0".	FILL: R.R EMBANKMENT SILTY SAND, COARSE TO FINE SAND, MOSTLY FINE SAND, 15-20% NONPLASTIC FINES, <10% SUBANGULAR GRAVEL, BROWN, (SM).
22.0'						
23.0'	NO SAMPLE		22.0 TO 25.0'		NO EMBANKMENT ROCK FILL ENCOUNTERED TO 23'-3/8" CASING. DROVE 3-3/8" CASING FROM 20.0 TO 25.0' AND WASHED OUT USING ROLLER TOOL BIT. RETAINED WASH WATER.	FILL: R.R. EMBANKMENT SILTY SAND, COARSE TO FINE SAND, MOSTLY FINE SAND, 15-20% NONPLASTIC FINES, 10-15% COARSE TO FINE GRAVEL, BROWN, (SM).
24.0'						
25.0'	S-6 1 JAR	1-3/8"	25.0 25.5'	5	DROVE 1-3/8" I.D. X 24" SPLIT BARREL SAMPLER FROM 25.0 TO 27.0'. RECOVERED 16-0"	SILTY SAND, FINE SAND, 30-40% NON TO LOW PLASTICITY FINES, MOIST, GRAY, (SM).
25.5'	S-6A 1 JAR	1-3/8"	25.5 TO 27.0'	2 3 5		
27.0'						

Site: PITTSFIELD, MA B&M P.P.	Boring No. FD B2-1	Page 3 of 5

DEPTH	CORE/SAMPLE NO.	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT. CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
28.0'						
28.0'	NO SAMPLE		27.0 TO 30.0		DROVE 2-3/8" CASING FROM 25.0 TO 30.0'. WASHED OUT CASING USING ROLLER ROCK BIT. RETAINED WASH WATER.	
30.0'						
30.0'			30.0 TO 32.0'	9	DROVE 1-3/8" I.D. x 24" SPLIT BARREL SAMPLER FROM 30.0 TO 32.0'.	SILTY GRAVEL, FINE ANGULAR GRAVEL, 10-15% NONPLASTIC FINES, 20-30% WELL GRADED SAND, COARSE TO FINE, GRAY, (GM).
31.0'	S-7 1 JAR	1-3/8"		13		
32.0'				12		
32.0'				14	RECOVERED 16 1/2".	
32.0'	NO SAMPLE		32.0 TO 35.0'		DROVE 2-3/8" CASING FROM 30.0 TO 35.0'. WASHED OUT CASING USING ROLLER ROCK BIT. RETAINED WASH WATER.	
35.0'						
35.0'			35.0 TO 37.0'	6	DROVE 1-3/8" I.D. x 24" SPLIT BARREL SAMPLER FROM 35.0 TO 37.0'.	THIN LAYERS OF SILTY SAND AND SANDY SILT: SILTY SAND, FINE MICACEOUS SAND, 20-30% NONPLASTIC FINES, BROWN OR GRAY, (SM). SANDY SILT, NONPLASTIC 30-50% FINE SAND, GRAY OR BROWN, (ML).
36.0'	S-8 1 JAR	1-3/8"		9		
37.0'				9		
37.0'				11	RECOVERED 19.0".	
37.0'	NO SAMPLE		37.0 TO 40.0'		DROVE 2-3/8" CASING FROM 35.0 TO 40.0'. WASHED OUT USING ROLLER BIT. RETAINED WASH WATER.	
40.0'						
40.0'			40.0 TO 42.0'	7	DROVE 1-3/8" I.D. x 24" SPLIT BARREL SAMPLER FROM 40.0 TO 42.0'	THIN LAYERS OF SILTY SAND AND SANDY SILT: SAME AS S-8 EXCEPT 3 THIN LAYERS OF FINE MEDIUM SAND.
41.0'	S-9 1 JAR	1-3/8"		10		
42.0'				13		
42.0'				17	RECOVERED 13.0".	
42.0'	NO SAMPLE		42.0 TO 45.0'		DROVE 2-3/8" CASING FROM 40.0 TO 45.0'. LOST WASH WATER AT 44.0'	
45.0'						

Site: PITTSFIELD, MA B'M: R.2.	Boring No. FD 82-1	Page 4 of 5

DEPTH	CORE/SAMPLE NO.	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
45.0'						
	S-10 1 JAR	1-3/8"	45.0 TO 47.0'	22 21 27 22	DROVE 1-3/8" I.D x 24" SPLIT BARREL SAMPLER FROM 45.0 TO 47.0' RECOVERED 12-0"	GRAVEL, FINE SUBROUNDED TO SUBANGULAR GRAVEL, 25-35% COARSE TO FINE SAND, 5-12% NONPLASTIC FINES, GRAYISH BROWN, (GP-GM).
47.0'						
47.0'	NO SAMPLE		47.0 TO 50.0'		DROVE 2-3/8" CASING FROM 45.0 TO 50.0' AND WASHED OUT USING ROLLER ROCK BIT. RETAINED WASH WATER.	
50.0'						
50.0'	S-11 1 JAR	1-3/8"	50.0 TO 52.0'	19 19 13 10	DROVE 1-3/8" I.D. x 24" SPLIT BARREL SAMPLER FROM 50.0 TO 52.0' RECOVERED 9-0"	GRAVEL, COARSE TO FINE SUBROUNDED TO ANGULAR GRAVEL, 25-35% COARSE TO FINE SAND, 5-12% NONPLASTIC FINES, GRAYISH BROWN, (GW-GM)
52.0'						
52.0'	NO SAMPLE		52.0 TO 55.0'		DROVE 2-3/8" CASING FROM 50.0 TO 55.0' AND WASHED OUT USING ROLLER ROCK BIT. RETAINED WASH WATER.	
55.0'						
55.0'	S-12 1 JAR	1-3/8"	55.0 TO 57.0'	35 27 27 22	DROVE 1-3/8" I.D x 24" SPLIT BARREL SAMPLER FROM 55.0 TO 57.0' RECOVERED 4-0"	GRAVEL, COARSE TO FINE, SUBROUNDED TO ANGULAR GRAVEL, 20-35% COARSE TO FINE SAND, 5-12% NONPLASTIC FINES, GRAYISH BROWN, (GW-GM).
57.0'						
57.0'	NO SAMPLE		57.0 TO 60.0'		DROVE 2-3/8" CASING FROM 55.0 TO 60.0' AND WASHED OUT USING ROLLER BIT. LOST WATER AT 59.0'.	
60.0'						
60.0'	S-13 1 JAR	1-3/8"	60.0 TO 60.4'	12"/0.4'	DROVE 1-3/8" I.D. x 24" SPLIT BARREL SAMPLER SAMPLED FROM 60.0 TO 60.4' LOOSING RETURNS AT 60.4'	GRAVEL AND ROCK FRAGMENTS OVERBURDEN SAME AS SAMPLE S-12.
61.0'						

Site: PITTSFIELD, MA B&M R.R	Boring No. FD 82-1	Page 5 of 5

DEPTH	CORE/SAMPLE NO	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH	BLOWS PER FT. CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
60.0'	CORED	1-3/8"	60.4' TO 65.4'	REC. 3.2'	DRIVE 2-3/8" CASING FROM 60.0 TO 60.4' AND WASHED OUT USING ROLLER ROCK BIT. CORED ROCK FROM 60.4 TO 65.4'. RECOVERED 3.2'.	MARBLE, UNWEATHERED, MEDIUM HARD, FINE GRAINED, WHITE.
62.0'						
63.0'						
64.0'						
65.0'						
66.0'					BOTTOM OF BORING 65.4'	

FIELD LOG OF TEST BORING IN ROCK

SITE B&M R.R., PITTSFIELD, MA ROLE NO. FD 82-1 PAGE 1 of 1

DATE	DEPTH FT. FROM	DEPTH FT. TO	RUN FT.	RUN REC'V'Y FT.	REC'V'Y %	DRILLING BEHAVIOR: SPEED	DRILLING BEHAVIOR: WATER	DRILLING BEHAVIOR: REASON FOR PULL	ACTUAL DRILLING TIME	BIT NO. SIZE AND TYPE	ADDITIONAL REMARKS
6-16-82	60.4	65.4	5.0'	3.2	64		NO LOSS	END OF RUN	15 MIN.	CHRISTENSEN 200 Nicor	

TOTAL BED ROCK DRILLED 5.0 FEET

TOTAL BED ROCK RECOVERED 3.2' FEET

BED ROCK RECOVERY 64.0 PERCENT

DRILLER Richie James

INSPECTOR Richard Burnell

NED FORM DEC 63 130 REPLACES EDITION OF APR 60 WHICH MAY BE USED UNTIL EXHAUSTED

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site Pittsfield, Mass. B&M R.R. Page 1 of 3 Pages

Boring No. FD 82-2 Desig. B Diam. (Casing) 2-3/8"

Co-ordinates. N Not Given E

Elevation Top of Boring 993.6' M.S.L. Hammer Wt. 140 lb Boring Started 6-16-82

Total Overburden Drilled 37.0 Feet Hammer Drop 30 in. Boring Completed 6-16-82

Elevation Top of Rock None Encountered M.S.L. Casing Left None

Total Rock Drilled N/A Feet Subsurface Water Data — Page —

Elevation Bottom of Boring 956.6' M.S.L. Obs. Well No

Total Depth of Boring 37.0' Feet Drilled By Driscoll Engineering & Testing Co.

Core Recovered N/A % No. Boxes — Mfg. Des. Drill Acker Bombardier

Core Recovered N/A Ft. — Diam. — In. Inspected By: Ronald F. Ruscetti

Soil Samples 1-3/8" In. Diam. 9 No. Classification By: Ronald F. Ruscetti

Soil Samples — In. Diam. — No. Classification By: —

DEPTH (1"=2.0')	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
0.0'	S-1 1 JAR	1-3/8"	0.0 TO 2.0'	1/12"	Drove 1-3/8" I.D. x 24" split barrel sampler from 0.0 to 2.0'.	Surface: Top of R.R. embankment 3' thick, edge of ballast. Miscellaneous fill materials: topsoil/organic silt, cinders and coal fragments.
				1		
2.0'				1	Recovered 4.0".	
3.0'	NO SAMPLE		2.0 TO 6.0'		Drove 2-3/8" casing from 0.0 to 5.0' and flushed hole remained open for sampling at 5.0'	
5.0'						
6.0'	S-2 1 JAR	1-3/8"	5.0 TO 11.0'	5	Drove split barrel sampler, 1-3/8" I.D x 24", from 5.0 to 7.0'.	Silty Sand, brown to fine sand, mostly fine sand, 10-15% plastic fines, 15-20% fine gravel, moist, Brown (SM). (Fill: R.R. Embankment)
				4		
				4		
7.0'				5	Recovered 8½".	
8.0'	NO SAMPLE		7.0 TO 10.0'		Drove 2-3/8" casing from 5.0 to 10.0' and washed out using roller bit. Returned with water.	
9.0'						
10.0'						

GENERAL REMARKS: Groundwater at 26.1', 1/4 hr after completion of boring

Site: PITTSFIELD, MA
B&M R.R.

Boring No. FD 82-2

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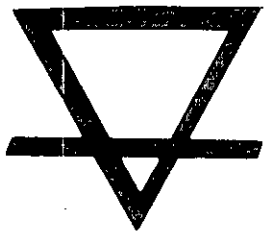
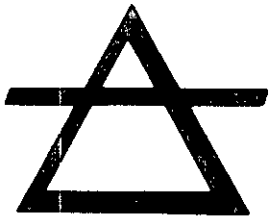
DEPTH	CORE/SAMPLE NO.	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT. CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
10.0'						
11.0'	S-3 1 JAR	1-3/8"	10.0 TO 12.0'	4 4 4 7	DROVE 1-3/8" I.D. X 24" SPLIT BARREL SAMPLER FROM 10.0 TO 12.0'. RECOVERED 17-0".	SILTY GRAVEL, COARSE TO FINE SUBANGULAR GRAVEL, MAXIMUM DIMENSION 1-1/4", 25-35% COARSE TO FINE SAND, 15-20% NONPLASTIC FINES, BROWN, (GM) (FILL: R.R. EMBANKMENT)
12.0'						
13.0'	NO SAMPLE		12.0 TO 15.0'		DROVE 2-3/8" CASING FROM 10.0 TO 15.0' AND WASHED OUT USING ROLLER ROCK BIT. RETAINED WASH WATER.	
15.0'						
16.0'	S-4 1 JAR	1-3/8"	15.0 TO 17.0'	6 4 5 5	DROVE 1-3/8" I.D. X 24" SPLIT BARREL SAMPLER FROM 15.0 TO 17.0'. RECOVERED 12-0"	FILL: R.R. EMBANKMENT SILTY GRAVEL, MOSTLY FINE SUBANGULAR GRAVEL, 20-35% COARSE TO FINE SAND, 10-20% NONPLASTIC FINES, BROWN, (GM).
17.0'						
18.0'	NO SAMPLE		17.0 TO 20.0'		DROVE 2-3/8" CASING FROM 15.0 TO 20.0' AND WASHED OUT USING ROLLER ROCK BIT. RETAINED WASH WATER	
20.0'						
21.0'	S-5 1 JAR	1-3/8"	20.0 TO 22.0'	4 3 4 7	DROVE 1-3/8" I.D. X 24" SPLIT BARREL SAMPLER FROM 20.0 TO 22.0'. RECOVERED 16-0".	FILL: R.R. EMBANKMENT SILTY SAND, COARSE TO FINE, MOSTLY FINE SAND, 15-20% NONPLASTIC FINES, 10-15% FINE SUBANGULAR GRAVEL, BROWN, (SM).
22.0'						
23.0'	NO SAMPLE		22.0 TO 25.0'		DROVE 2-3/8" CASING FROM 20.0 TO 25.0' AND WASHED OUT USING ROLLER ROCK BIT. RETAINED WASH WATER.	FILL: R.R. EMBANKMENT GRAVELLY SILT, NONPLASTIC, 20-35% SUBANGULAR TO SUB-ROUNDED GRAVEL, 10-15% COARSE TO FINE SAND, BROWN, (ML).
25.0'						
25.0'	S-6 1 JAR	1-3/4"	25.0 TO 26.0'	6 11	DRIVE 1-3/4" I.D. X 24" SPLIT BARREL SAMPLER FROM 25.0 TO 27.0'	
▽						SANDY SILT, NONPLASTIC FINES, 15-20% FINE SAND, (CONT.)
27.0'	S-6A 1 JAR	1-3/8"	26.0 TO 27.0'	5 6	RECOVERED 20-0"	

Site: PITTSFIELD, MA B&M RR.	Boring No. FD 82-2	Page 3 of 3

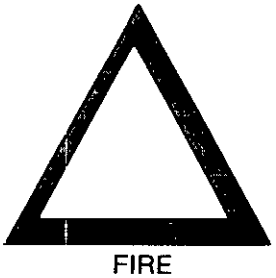
DEPTH	CORE/SAMPLE NO.	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT. CORE RECVT	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
0 to 20'						
28.0'	NO SAMPLE		27.0 TO 30.0'		DROVE 2-3/8" CASING FROM 25.0 TO 30.0' AND WASHED OUT USING ROLLER BIT. RETAINED WASH WATER.	<10% FINE SUBROUNDED GRAVEL, <10% VERY SMALL ROOTS & LEAVES INTERBEDDED, DARK GRAY, (ML).
29.0'						
30.0'				17	DRIVE 1-3/8" I.D. x 24" SPLIT BARREL SAMPLER FROM 30.0 TO 32.0'.	THINLY LAYERED SILTY SAND AND ORGANIC SANDY SILT:
31.0'	S-7 1 JAR	1-3/8"	30.0 TO 32.0'	17		SILTY SAND, COARSE TO FINE SAND, 15-20% NONPLASTIC FINES, GRAYISH, (SM).
32.0'				9		
				9	RECOVERED 7½".	ORGANIC SANDY SILT, NONPLASTIC FINES, FINE SAND, THIN LAYERS OF DECAYED LEAVES AND WOOD INTERBEDDED, DARK GRAY, (OL).
33.0'	NO SAMPLE		33.0 TO 35.0'		DROVE 2-3/8" CASING FROM 30.0 TO 35.0' AND WASHED OUT USING ROLLER BIT. RETAINED WASH WATER.	
34.0'						
35.0'				8	DROVE 1-3/8" I.D. x 24" SPLIT BARREL SAMPLER FROM 35.0 TO 37.0'.	THINLY LAYERED SILTY SAND AND SANDY SILT:
36.0'	S-8 1 JAR	1-3/8"	35.0 TO 37.0'	9		SILTY SAND, LAYERS VARY FROM COARSE TO FINE SAND, 15-25% NONPLASTIC FINES, BROWN, (SM).
				10		
				12	RECOVERED 18-0".	SANDY SILT, NONPLASTIC FINES, MOSTLY FINE SAND, BROWN, (ML).
37.0'					BOTTOM OF BORING 27.0'	



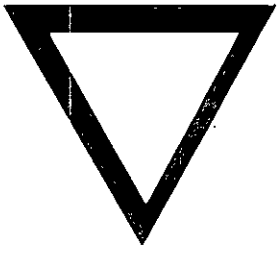
EARTH



AIR

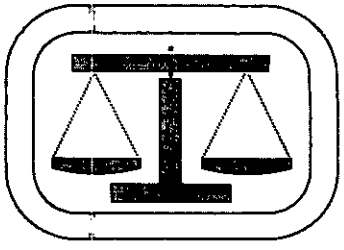


FIRE



WATER

In ancient times
Greek and Hindu philosophers
believed that there were
four elements in the material universe
— EARTH, AIR, FIRE and WATER.
Over the years
man's knowledge has expanded
and the world of materials
is now known to be extremely complex.
The unravelling of these complexities
is the continuing goal of
Briggs Engineering & Testing Company.



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